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EXAMINER	
STULTZ, JESSICA T	
ART UNIT	**PAPER NUMBER**
2873	

DATE MAILED: 03/04/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

11-A

Office Action Summary	Application No.	Applicant(s)	
	10/724,621	NAKAYA ET AL.	
	Examiner	Art Unit	
	Jessica T. Stultz	2873	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-22* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-22* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *02 December 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *0604*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Specification

The abstract of the disclosure is objected to because it is too long. Specifically, the abstract cannot exceed more than 150 words; therefore it needs to be shortened. Correction is required. See MPEP 37 CFR 1.72.

Claim Objections

Claim 4 is objected to because of the following informalities: in claim 4, "for each of pixels" should be "for each of the pixels". Appropriate correction is required.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1-22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hirawa in view of Sakaue et al.

Regarding claim 1, Hirawa discloses an imaging head which faces an imaging surface and is relatively moved along the imaging surface in a predetermined scanning direction (Column 4, line 41-Column 5, line 18, wherein the imaging head is recording head "20" which is moved in a main scanning direction "X" or sub-scanning direction "Y" along the imaging plate "11" mounted on recording drum "10", Figure 1), the imaging head comprising: an imaging element group including a plurality of imaging elements in a plane substantially parallel to the imaging surface (Column 6, line 11-Column 7, line 27, wherein the imaging elements are "E1-

E8" of spatial light modulator "24", which are located in a plane substantially parallel to the imaging surface "11", Figures 1-5), the imaging elements being one-dimensionally arranged (Figures 3-5), and the imaging element group generating a group of image pixels at the imaging surface in a one-dimensional arrangement (Column 6, line 11-Column 7, line 27, wherein the image pixels are "P1-P8" of imaging plate "11", Figures 3-5) which is inclined, as a whole, at a predetermined inclination angle with respect to the scanning direction (Column 2, lines 21-55, wherein the pixel units, i.e. pixels "P1-P8" are set at an inclination angle with respect to the scanning direction); and an alteration section, which, on the basis of a difference between the predetermined inclination angle of the imaging element group and an actual inclination angle of the image pixel group, alters a number of image pixels that are employed in a direction which is inclined from the scanning direction by the actual inclination angle (Column 2, lines 21-55, wherein the pixel units, i.e. pixels "P1-P8" are shifted responsive to the inclination angle and Column 8, line 5-Column 10, line 12, wherein the alteration section is the image signal processor "44", which includes buffer memories "BM1-3", which alter a group of pixels, Figures 6-12), but does not specifically disclose that the imaging elements and the image pixels are two-dimensionally arranged. Sakaue et al teaches of an image processing device wherein image pixels and modulation elements are two-dimensionally arranged for the purpose of achieving pixel shifting in the scanning and sub-scanning directions (Column 9, line 59-Column 10, line 30, Figures 14A-B, 15A-B, and 16A-B). Therefore it would have been obvious to one having ordinary skill in the art at the time the invention was made for the imaging elements and the image-pixels to be two-dimensionally arranged since Sakaue et al teaches of an image processing

device wherein image pixels and modulation elements are two-dimensionally arranged for the purpose of achieving pixel shifting in the scanning and sub-scanning directions.

Regarding claim 2, Hirawa and Sakaue et al disclose and teach of an imaging head as shown above, and Hirawa further discloses a resolution conversion section which converts image data so as to convert a resolution of the image data in a direction intersecting the direction of relative movement to a resolution of the image pixel group in the direction intersecting the direction of relative movement (Column 6, line 38-Column 7, line 65, wherein the pixels of the recording head "20" and the pixels of the imaging plate "11" have the same resolution in Figures 3-5, and Column 8, lines 40-49, wherein the resolution converter "48A" converts the resolution of the image data in a direction intersecting the relative movement to a resolution of the image pixel group, Figure 7).

Regarding claim 3, Hirawa and Sakaue et al disclose and teach of an imaging head as shown above, and Hirawa further discloses that the conversion of the image data includes reduction of the image data (Column 6, line 49-Column 7, line 65, wherein the conversion includes reduction of the image data, wherein the data from "E1-E8" is reduced to smaller pixel units "P1-P8", Figures 4-5).

Regarding claim 4, Hirawa and Sakaue et al disclose and teach of an imaging head as shown above, and Hirawa further discloses that the imaging element group comprises a modulated light irradiation apparatus which irradiates light, which is modulated for each of the pixels in accordance with image information, at an exposure surface which includes the imaging surface (Column 5, line 58-Column 6, line 10, wherein the light irradiation apparatus includes

laser light source "21" which is modulated by spatial light modulator "24" and forms an image on imaging plate "11", Figure 2).

Regarding claim 5, Hirawa and Sakaue et al disclose and teach of an imaging head as shown above, and Hirawa further discloses that the modulated light irradiation apparatus comprises: a laser device which irradiates laser light (Column 5, line 58-Column 6, line 10, wherein the laser device is laser light source "21", Figure 2); a spatial light modulation element at which a plurality of imaging element portions, which respectively alter light modulation states in accordance with control signals, are arranged in a one-dimensional arrangement (Column 5, line 58-Column 6, line 21, wherein the spatial light modulator "24" includes a plurality of imagine element portions "E1-E8", Figures 2-3), the spatial light modulation element modulating the laser light irradiated from the laser device (Column 5, lines 58-67); and a control section which controls the imaging element portions by the control signals, which are generated in accordance with the image information (Column 8, lines 5-39, wherein the control section is image signal processor "44", wherein the control signals are generated from the buffer memories "BM1-BM3", Figure 6), but does not specifically disclose that the imaging element portions are two-dimensionally arranged. Sakaue et al teaches of an image processing device wherein modulation elements are two-dimensionally arranged for the purpose of achieving pixel shifting in the scanning and sub-scanning directions (Column 9, line 59-column 10, line 30, Figures 14A-B, 15A-B, and 16A-B). Therefore it would have been obvious to one having ordinary skill in the art at the time the invention was made for the imaging element portions to be two-dimensionally arranged since Sakaue et al teaches of an image processing device wherein modulation elements

are two-dimensionally arranged for the purpose of achieving pixel shifting in the scanning and sub-scanning directions.

Regarding claims 6-7, Hirawa and Sakaue et al disclose and teach of an imaging head as shown above, and Hirawa further discloses that the spatial light modulation elements comprise an array of either a plurality of micromirror, the angles which are alterable in accordance with the control signals; or a liquid crystal shutter array, capable of blocking transmitted light in accordance with the control signals (Column 6, lines 1-4, wherein the spatial light modulator "24" is a digital micromirror device or a liquid crystal shutter).

Regarding claim 8, Hirawa and Sakaue et al disclose and teach of an imaging head as shown above, and Hirawa further discloses that the alteration section alters the number of pixels employed so as to suppress variation of an image pitch in the direction which is inclined by the actual inclination angle from the scanning direction to a certain range (Column 2, lines 21-55, wherein the pixel units, i.e. pixels "P1-P8" are shifted responsive to the inclination angle and Column 8, line 5-Column 10, line 12, wherein the alteration section is the image signal processor "44", which includes buffer memories "BM1-3", which alter a group of pixels while maintaining the pitch of a scanning line of pixels with a given width, Figures 6-12).

Regarding claim 9, Hirawa and Sakaue et al disclose and teach of an imaging head as shown above, and Hirawa further discloses that when the actual inclination angle is smaller than the predetermined inclination angle, the number is pixels employed is increased (Column 8, line 5-Column 10, line 12, wherein the alteration section is the image signal processor "44" which alters a group of pixels respectively based on the angle difference between the write angle and the read angle, so that the difference is equal to the inclination angle, Figures 6-12).

Regarding claim 10, Hirawa and Sakaue et al disclose and teach of an imaging head as shown above, and Hirawa further discloses that when a difference between the predetermined inclination and the actual inclination angle exceeds a certain value, the number is pixels employed is increased by one (Column 8, line 5-Column 10, line 12, wherein the alteration section is the image signal processor "44" which alters a group of pixels respectively based on the angle difference between the write angle and the read angle, so that the difference is equal to the inclination angle, Figures 6-12).

Regarding claim 11, Hirawa and Sakaue et al disclose and teach of an imaging head as shown above, and Hirawa further discloses that when the actual inclination angle is larger than the predetermined inclination angle, the number of pixels employed is decreased (Column 8, line 5-Column 10, line 12, wherein the alteration section is the image signal processor "44" which alters a group of pixels respectively based on the angle difference between the write angle and the read angle, so that the difference is equal to the inclination angle, Figures 6-12).

Regarding claim 12, Hirawa and Sakaue et al disclose and teach of an imaging head as shown above, and Hirawa further discloses that when a difference between the actual inclination and the predetermined inclination angle exceeds a certain value, the number is pixels employed is decreased by one (Column 8, line 5-Column 10, line 12, wherein the alteration section is the image signal processor "44" which alters a group of pixels respectively based on the angle difference between the write angle and the read angle, so that the difference is equal to the inclination angle, Figures 6-12).

Regarding claim 13, Hirawa and Sakaue et al disclose and teach of an imaging head as shown above, and Hirawa further discloses an imaging device including the imaging head and a

movement section which relatively moves the imaging head at least in the predetermined direction (Column 5, lines 2-49, wherein the movement section is controller "40", specifically drive controller "42" which moves the imaging head "20" in the scanning or sub-scanning direction, Figure 1).

Regarding claim 14, Hirawa and Sakaue et al disclose and teach of an imaging device as shown above, and Hirawa further discloses a resolution conversion section which converts image data so as to convert a resolution of the image data in a direction intersecting the direction of relative movement to a resolution of the image pixel group in the direction intersecting the direction of relative movement (Column 6, line 38-Column 7, line 65, wherein the pixels of the recording head "20" and the pixels of the imaging plate "11" have the same resolution in Figures 3-5, and Column 8, lines 40-49, wherein the resolution converter "48A" converts the resolution of the image data in a direction intersecting the relative movement to a resolution of the image pixel group, Figure 7).

Regarding claim 15, Hirawa and Sakaue et al disclose and teach of an imaging device as shown above, and Hirawa further discloses that the conversion of the image data includes reduction of the image data (Column 6, line 49-Column 7, line 65, wherein the conversion includes reduction of the image data, wherein the data from "E1-E8" is reduced to smaller pixel units "P1-P8", Figures 4-5).

Regarding claim 16, Hirawa and Sakaue et al disclose and teach of an imaging device as shown above, and Hirawa further discloses that the alteration section of the imaging head suppresses variation of an image pitch in the direction which is inclined by the actual inclination angle from the scanning direction to a certain range (Column 2, lines 21-55, wherein the pixel

units, i.e. pixels "P1-P8" are shifted responsive to the inclination angle and Column 8, line 5-Column 10, line 12, wherein the alteration section is the image signal processor "44", which includes buffer memories "BM1-3", which alter a group of pixels while maintaining the pitch of a scanning line of pixels with a given width, Figures 6-12).

Regarding claim 17, Hirawa and Sakaue et al disclose and teach of an imaging device as shown above, and Hirawa further discloses an imaging method using the imaging head as disclosed above including relatively moving the imaging head along the imaging surface in the predetermined scanning direction for imaging (Column 5, lines 2-49, wherein the movement section is controller "40", specifically drive controller "42" which moves the imaging head "20" in the scanning or sub-scanning direction, Figure 1), the method comprising the steps of: altering the number of image pixels that are employed in the direction which is inclined from the scanning direction by the actual inclination angle, on the basis of the difference between the predetermined inclination angle of the imaging element group and the actual inclination angle of the image pixel group; and employing the altered number of image pixels for imaging at the imaging surface (Column 2, lines 21-55, wherein the pixel units, i.e. pixels "P1-P8" are shifted responsive to the inclination angle and Column 8, line 5-Column 10, line 12, wherein the alteration section is the image signal processor "44", which includes buffer memories "BM1-3", which alter a group of pixels, Figures 6-12).

Regarding claim 18, Hirawa and Sakaue et al disclose and teach of an imaging method as shown above, and Hirawa further discloses that the step of altering the number of pixels employed comprises the step of: suppressing variation of an image pitch in the direction which is inclined by the actual inclination angle from the scanning direction, to a certain range (Column

2, lines 21-55, wherein the pixel units, i.e. pixels "P1-P8" are shifted responsive to the inclination angle and Column 8, line 5-Column 10, line 12, wherein the alteration section is the image signal processor "44", which includes buffer memories "BM1-3', which alter a group of pixels while maintaining the pitch of a scanning line of pixels with a given width, Figures 6-12).

Regarding claim 19, Hirawa and Sakaue et al disclose and teach of an imaging method as shown above, and Hirawa further discloses that the step of suppressing include a step of increasing the number of pixels employed in the direction which is inclined by the actual inclination angle from the scanning direction, when the actual inclination angle is smaller than the predetermined inclination angle (Column 8, line 5-Column 10, line 12, wherein the alteration section is the image signal processor "44" which alters a group of pixels respectively based on the angle difference between the write angle and the read angle, so that the difference is equal to the inclination angle, Figures 6-12).

Regarding claim 20, Hirawa and Sakaue et al disclose and teach of an imaging method as shown above, and Hirawa further discloses that the step of increasing the number of pixels includes increasing the number of pixels by one, when a difference between the predetermined inclination and the actual inclination angle exceeds a certain value (Column 8, line 5-Column 10, line 12, wherein the alteration section is the image signal processor "44" which alters a group of pixels respectively based on the angle difference between the write angle and the read angle, so that the difference is equal to the inclination angle, Figures 6-12).

Regarding claim 21, Hirawa and Sakaue et al disclose and teach of an imaging method as shown above, and Hirawa further discloses that the step of suppressing include a step of decreasing the number of pixels employed in the direction which is inclined by the actual

inclination angle from the scanning direction, when the actual inclination angle is larger than the predetermined inclination angle (Column 8, line 5-Column 10, line 12, wherein the alteration section is the image signal processor "44" which alters a group of pixels respectively based on the angle difference between the write angle and the read angle, so that the difference is equal to the inclination angle, Figures 6-12).

Regarding claim 22, Hirawa and Sakaue et al disclose and teach of an imaging method as shown above, and Hirawa further discloses that the step of decreasing the number of pixels includes decreasing the number of pixels by one, when a difference between the actual inclination and the predetermined inclination angle exceeds a certain value (Column 8, line 5-Column 10, line 12, wherein the alteration section is the image signal processor "44" which alters a group of pixels respectively based on the angle difference between the write angle and the read angle, so that the difference is equal to the inclination angle, Figures 6-12).

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Furukawa et a and Jain et al are cited as having some similar structure since they both disclose a scanning image display apparatus with an imaging element group.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jessica T. Stultz whose telephone number is (571) 272-2339. The examiner can normally be reached on M-F 8-4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Georgia Epps can be reached on 571-272-2328. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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